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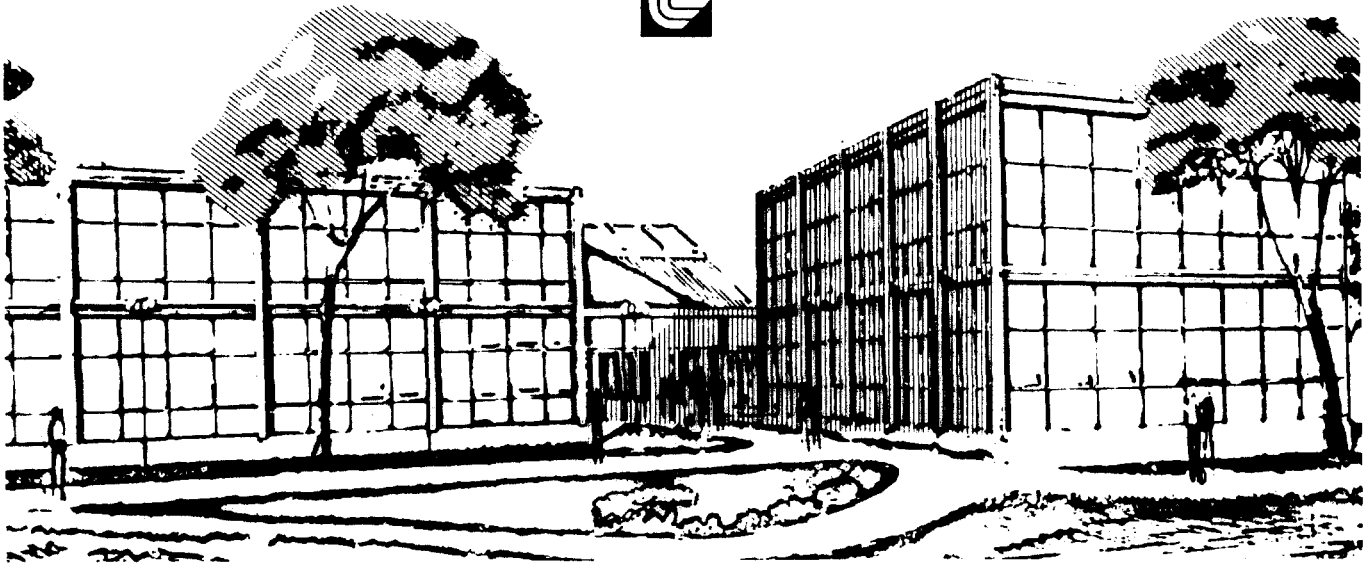

A MULTIDISCIPLINARY TRAINING PROGRAM TO CREATE A NEW BREED OF RADIATION MONITOR: "THE HEALTH AND SAFETY TECHNICIAN"*

by

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Introduction

Since the beginning of the nuclear era, radiation protection has been a major concern of our society. Much has been learned about the methods of radiation protection and control during these formative years, and this knowledge has been used to develop some of the most successful protection programs in the world. It is a credit to the nuclear industry and research community that the safety record in this area is outstanding. During the past decade, however, the growing awareness of safety in our society has resulted in an increased level of concern for worker and environmental protection in areas other than radiation protection. This transition does not mean that radiation safety has become less important than it was in the past, but that other areas of safety have taken on increased importance.

Beginning with the passage of the Occupational Safety and Health Act in 1970, the federal government began to inspect the conditions of the workplace and regulate the use of various materials and chemicals[1]. In 1973 the term "carcinogen" took on a new meaning when the Occupational Safety and Health Administration issued temporary emergency standards for fourteen organic chemicals[2]. The area of industrial safety increased in importance when it was realized that additional safety measures could dramatically reduce industrial injuries and deaths. In addition to governmental interest in chemical and industrial safety, the public became more aware of the hazards involved in the workplace and the research environment. The media also brought pressure on industry and the research community to prove that their operations were "safe".

While government regulations and public opinions were changing, the safety staff at the Lawrence Livermore Laboratory began to see a clear need developing for a change in field safety support. In the past, field monitoring support personnel were skilled only in radiation safety. They received an intensive training program in radiation safety during their first two years on the job, and the majority of their work primarily involved radiation protection. It became apparent, however, that more and more field-monitoring activities involved areas of safety other than radiation protection. After analyzing the situation, we were faced with an important decision: We would either have to increase our staffing in the field monitoring area or train field monitoring personnel skilled in all safety disciplines. The optimum solution to the problem would be to have individuals in the field who could respond to a variety of safety problems and assist all of the professionals on our safety staff. Our decision then was to train the existing radiation-monitoring personnel in the other safety disciplines to enable them to provide multidisciplinary safety support. Because these individuals would be involved in areas of safety other than radiation protection, the title Radiation Monitor was changed to Health and Safety Technician--a better description of their functions.

Advanced Health and Safety Technician Training Program

In 1976, the Hazards Control Department at Lawrence Livermore Laboratory initiated the Advanced Health and Safety Technician Training Program, an in-depth, comprehensive training series covering the following safety disciplines:

- Explosive Safety
- Fire Safety
- Industrial Hygiene
- Industrial Safety
- Health Physics

The program provides Health and Safety Technicians with a formal program of instruction to expand their knowledge and improve their performance in field-safety skills. Our objective is to develop an individual who can assist the professional safety discipline members in solving complex safety problems. As stated in their job description, the primary duty of the Health and Safety Technician is to assist professional and more advanced technical support personnel in providing health and safety support to all areas of the laboratory.

Program Description

The students are exposed to a variety of subjects. Table 1 lists the topics included in the training program. The emphasis is placed on practical, field-oriented safety techniques and information. Many sessions involve "hands-on" participation by the students or field tours to observe equipment and operations. In addition to the topics listed in Table 1, supplemental training is provided, which includes intensive on-the-job training and specialized training in areas such as criticality safety and carcinogen control.

The class meets once every two weeks for four hours. The training program is completed in 16 months and a new one begins immediately. Because of the continuous scheduling format, new technicians are enrolled soon after they are hired and finish the program whenever all courses have been completed. This training program is considered part of the job assignment for all new Health and Safety Technicians.

The instructors, professional safety discipline members, prepare a detailed instructional outline of their topic and conduct a "dry run" presentation before participating in the actual program. The instructors are evaluated by the students themselves following each class. Most of the training materials used by the instructors are developed in-house. Several of the sessions are videotaped for make-up sessions and for use in other training programs.

Testing is an integral part of our training program to ensure quality instruction and proper student motivation. Examinations are given during the sessions to follow the students progress and monitor the quality of the

instruction. Students who have difficulty with a particular area may be tutored individually. Certificates of completion are awarded to the student who successfully completes the program.

Results

To be successful, a training program must produce positive results in the area of need. Since the beginning of the program in 1976, ten employees have completed our program, and twenty are enrolled in the current session. The results of the program have been very favorable. Supervisors report that the new Health and Safety Technicians are able to readily assist in solving safety problems involving more than one safety discipline. In addition, the professional safety discipline members report improvements in their communication with the technicians in the field. Several local organizations have enrolled their employees in our program and their responses have also been favorable. To date, the class schedule has not caused a problem in terms of time spent away from work. The only negative result, for the organization, has been the resignations of several of the newly trained technicians who have accepted positions elsewhere. Also, several technicians, after being exposed to the various safety disciplines, have decided to pursue degrees in those areas that interested them the most. From our standpoint, the training program has been extremely successful and has improved the quality and effectiveness of operational safety at Lawrence Livermore Laboratory.

TABLE 1

Advanced Health and Safety Technician Training Series

Safety Discipline	Topics	Time Allotment (hr)
Explosive Safety	Explosive Safety Orientation	4
	Explosive Safety Practice	4
		Total: 8 hrs
Fire Safety	Self Inspection Program	4
	Fire Protection Systems-Sprinklers	4
	Fire Protection Systems-Alarms	4
	Emergency Planning	2
	Evacuation	2
	Exits	2
	Fire Hazards	2
		Total: 20 hrs
Industrial Hygiene	Respiratory Protection	4
	Industrial Toxicology	4
	Industrial Noise	2
	Portable Water Systems	2
	Industrial Ventilation	4
	Air Sampling	2
	Precautionary Labeling	1
	Handling Chemical Carcinogens	2
	Chemical Safety	3
	Alkali Metals	1
		Total: 25 hrs
Industrial Safety	Construction Safety	4
	Compressed Gases	4
	Laser Safety	4
	Machine Tool Operation	2
	Materials Handling	4
	Electrical Safety	3
		Total: 21 hrs
Health Physics	Radiation Safety Fundamentals	2
	Radioactive Decay in Nuclear Reactions	2
	Detection and Measurement of Radiation	2
	Radiation Instruments and Their Uses	2
	Chronic and Acute Effects of Radiation	2
	Dosimetry of External Radiation Sources	2
	Deposition and Dose from Radioactive Materials in Man	2
	X-Ray Machines and Particle Accelerators	2

Health Physics Con't	Fission and Fusion Reactors	2
	Basic Radiation Shielding	2
	Streaming ans Scattering of Radiation	2
	Criticality Safety	2
	Effluent Monitoring	2
		Total: 26 hrs
Operational Safety	High Activity Alpha Fission	4
	Containment Policy and Procedures	4
	Containment Techniques	4
	Decontamination Techniques	4
	Off-Shift Operations	1
	Risk Management Techniques	5
		Total: 22 hrs

Total Program Length: 122 hours

REFERENCES

1. Occupational Safety and Health Administration, Occupational Safety and Health Administration Safety and Health Standards, 29 CFR 1910, (1976).

2. Occupational Safety and Health Administration, "Emergency Temporary Standard on Certain Carcinogens", in Federal Register, 38, (85), 10929 (1973).